

IN THE CLAIMS:

1. (Previously Amended) An optical symbol reading device comprising:
 - a) an image data input section including:
 - 1) a front surface symbol reading device and back surface symbol reading device,
 - 2) an image data input unit for receiving a bar code label, characters, symbols, or image data on an article that is moved by a conveyor, and
 - 3) an image data input focus point modifier;
 - b) an article detector for detecting that said article has entered a read zone;
 - c) an interpreter for converting electric signals from said image data input section to electronic signals representative of at least one of numbers and characters as interpretation results;
 - d) an interpretation result output section for outputting the interpretation results of said interpreter to an external device;
 - e) a front surface/back surface position detector for continuously detecting a position on said conveyor of both a front surface and a back surface of an article as said article is moved by said conveyor to provide data indicative of continuously changing positions of said article ; and
 - f) an image data input focus point control section for outputting data from said front surface/back surface position detector to said image data input focus point modifier, said image data input focus point modifier continuously adjusting the focus point of said front surface reading device and said back surface reading device based on said data from said front surface/back surface position detector, said continuous adjusting being made without time delay based on conveyor speed.
2. (Original) An optical symbol reading device according to claim 1 wherein said front surface/back surface position detector comprises:

means that is provided with a light projection position detector and a light reception position detector made up of a plurality of transmissive multiple optical axis sensors, for finding the position of the front surface or back surface of said article by detecting which

transmissive multiple optical axis sensors of the plurality of transmissive multiple optical axis sensors of said light projection position detector are being shielded by said article.

3. (Cancelled) An optical symbol reading device according to claim 1 wherein said front surface/back surface position detector comprises:

means provided with a rotary encoder that is attached to said conveyor, for finding the position of the front surface or back surface of said article by counting pulses from said rotary encoder and measuring a distance of movement of said conveyor.

4. (Original) An optical symbol reading device according to claim I wherein said image data input focus point control section comprises:

means for converting front surface/back surface position data of said article that are received from said front surface/back surface position detector to a reading distance, which is the distance between said image data

input unit and the front surface or back surface of said article, and outputting said reading distance as focus point data to said image data input focus point modifier.

5. (Original) An optical symbol reading device according to claim 1 wherein said image data input focus point modifier comprises:

means for matching the focus point to the front surface or back surface of said article that moves constantly over time by setting the focus point to a position designated by said focus point data that are received from said image data input focus point control section.

6. (Previously Amended) An optical symbol reading device according to claim 1 further comprising:

means for reading two surfaces, [i.e.,] a side surface/back surface or a side surface/front surface, of an article moved by a conveyor by fixing a focus on a position of said side surface and reading said side surface when receiving a bar code label, characters, symbols, or image data on the side surface of said article from said image data input unit.

7. (Currently Amended) A method of reading an optical symbol, comprising the steps of:

- a) conveying an article on a conveyor, said article including a first optical symbol on a front surface and a second optical symbol on a back surface;
- b) reading said first optical symbol while conveying said article; and
- c) reading said second optical symbol while conveying said article,
- d) wherein the step of reading said first optical symbol comprises the steps of:
 - 1) detecting said front surface of said article;
 - 2) calculating a distance from an optical symbol reader to said front surface;
 - 3) continuously adjusting ~~the~~a focus of said optical symbol reader based on said calculated distance to said front surface without time delay based on conveyor speed; and
 - 4) sensing said first optical symbol with said optical symbol reader, and
- e) wherein the step of reading said second optical symbol comprises the steps of:
 - 1) detecting said back surface of said article;
 - 2) calculating a distance from said optical symbol reader to said back surface;
 - 3) continuously adjusting the focus of said optical symbol reader based on said calculated distance to said back surface without time delay based on conveyor speed; and
 - 4) sensing said second optical symbol with said optical symbol reader.

8. (Previously Added) The method of claim 7, wherein the steps of detecting said front and back surfaces comprises the steps of:

sensing a plurality of optical axis, each of said optical axis corresponding to a different position along a conveyor; and
determining which of said plurality of optical axis are shielded by said article.

9. (Previously Added) The method of claim 7, wherein the step of detecting said front surface detects the leading edge of said surface.

10. (Previously Added) The method of claim 7, wherein the step of detecting said back surface detects the trailing edge of said surface.

11. (Currently Amended) A method of reading a symbol, comprising the steps of:

a) conveying an article on a conveyor, said article including at least one optical symbol which is positioned on at least one of a front surface and a back surface of said article;

b) reading said at least one optical symbol by:

1) detecting at least one of said front surface and said back surface of said article;

2) calculating a distance from an optical symbol reader to said at least one of said front surface and said back surface of said article;

3) continuously adjusting ~~the~~a focus of said optical symbol reader based on said calculated distance to said at least one of said front surface and back surface without time delay based on conveyor speed; and

4) sensing said at least one optical symbol with said optical symbol reader.